



ENERGY PROGRAM AT ROCK ISLAND ARSENAL



COLONEL Mike G. Mullins, Commander

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PUBLIC WORKS

Phone: 309-782-2121

Email: AMSTA-RI-PW@ria.army.mil

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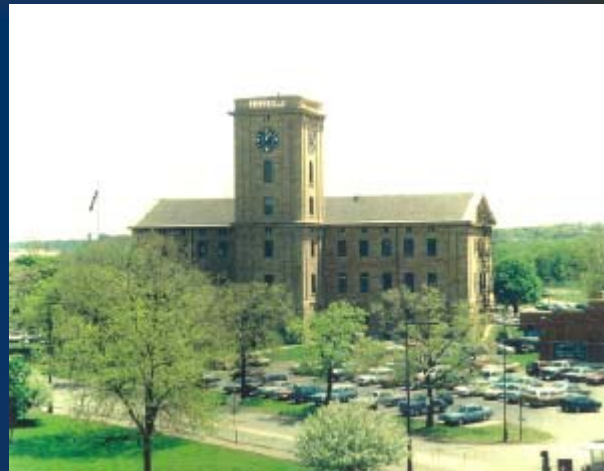
ROCK ISLAND ARSENAL



- 200 BUILDINGS
- 6.5 MILLION SQ FT



BRIEFING OUTLINE

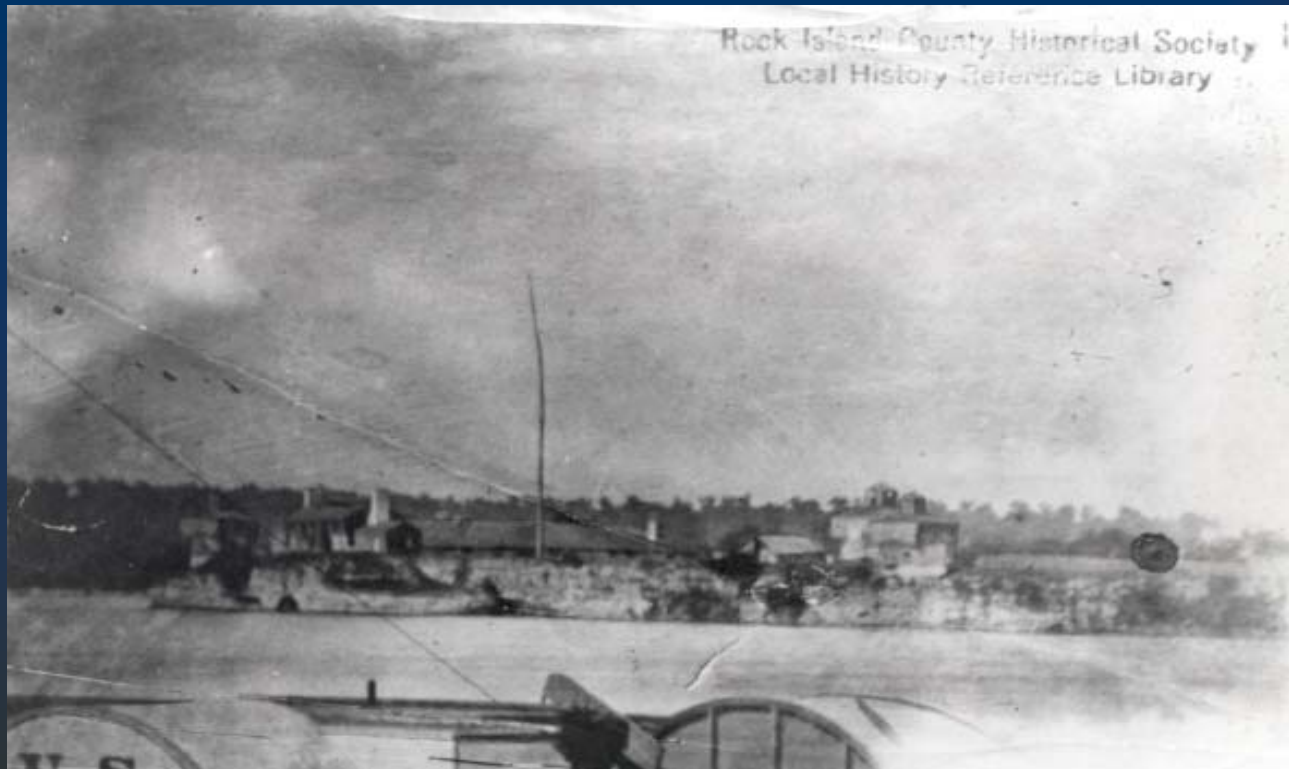


- ARSENAL ISLAND HISTORY
- MANUFACTURING HISTORY
- ENERGY PLAN
- ENERGY PROJECTS
- INDUSTRIAL BUILDINGS -
ENERGY OPPORTUNITIES





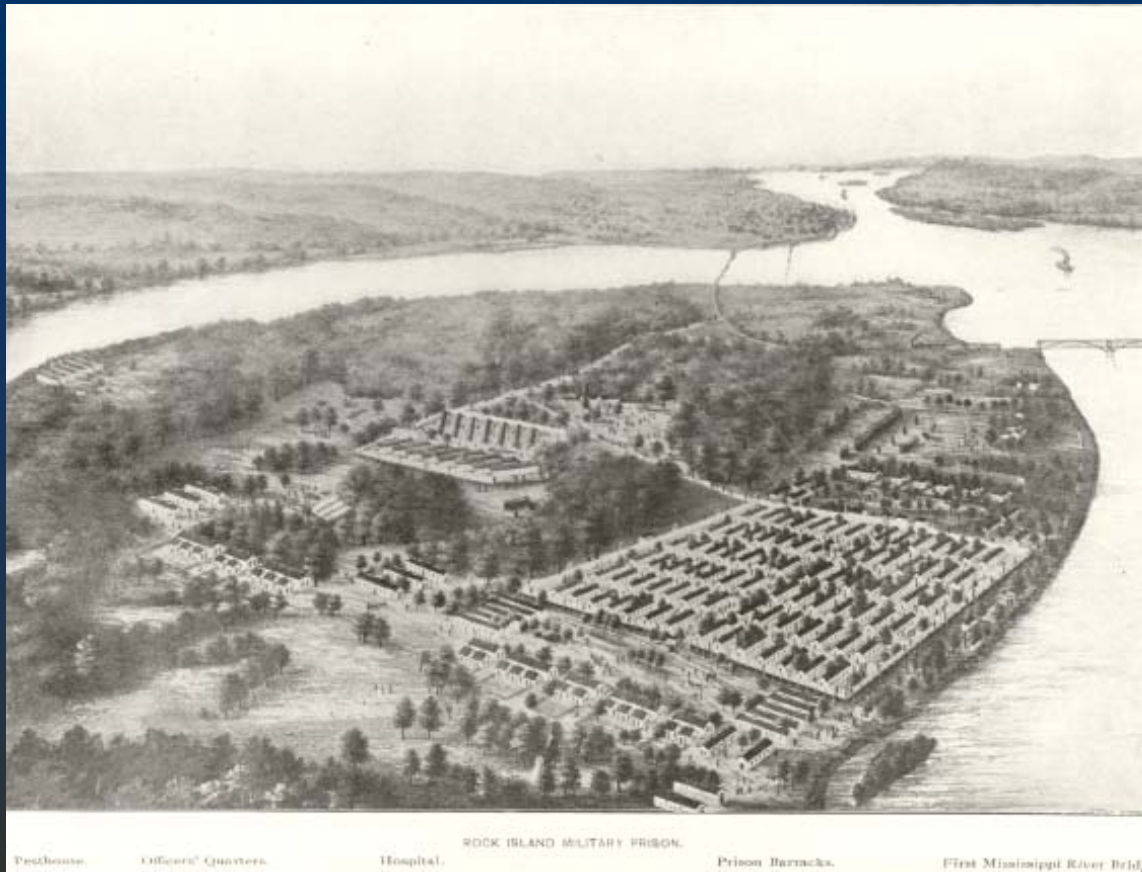
ARSENAL ISLAND HISTORY



- Ft Armstrong occupied island from 1812 –1836
- The Arsenal was established in July 1862



ARSENAL ISLAND HISTORY



- Civil War Prison Barracks, 1864-1865
- 84 Barracks, 10,000 Prisoners at peak



ARSENAL ISLAND HISTORY



ROCK ISLAND ARSENAL ORDNANCE DEPARTMENT

Roll Call, Rock Island Prison Barracks 1864-1865.



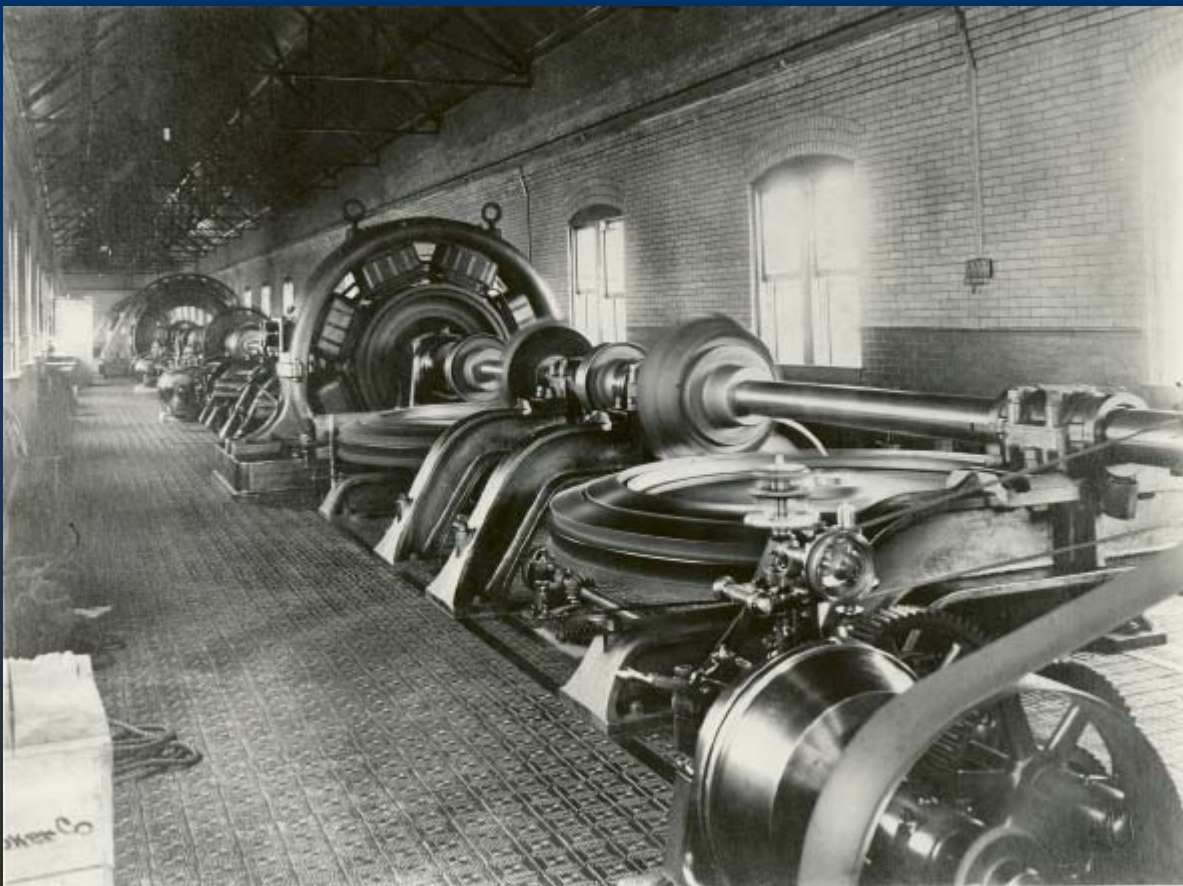
ARSENAL ISLAND HISTORY



- Telodynamic Hydro Power, 1879
- Wire-cable power transmission



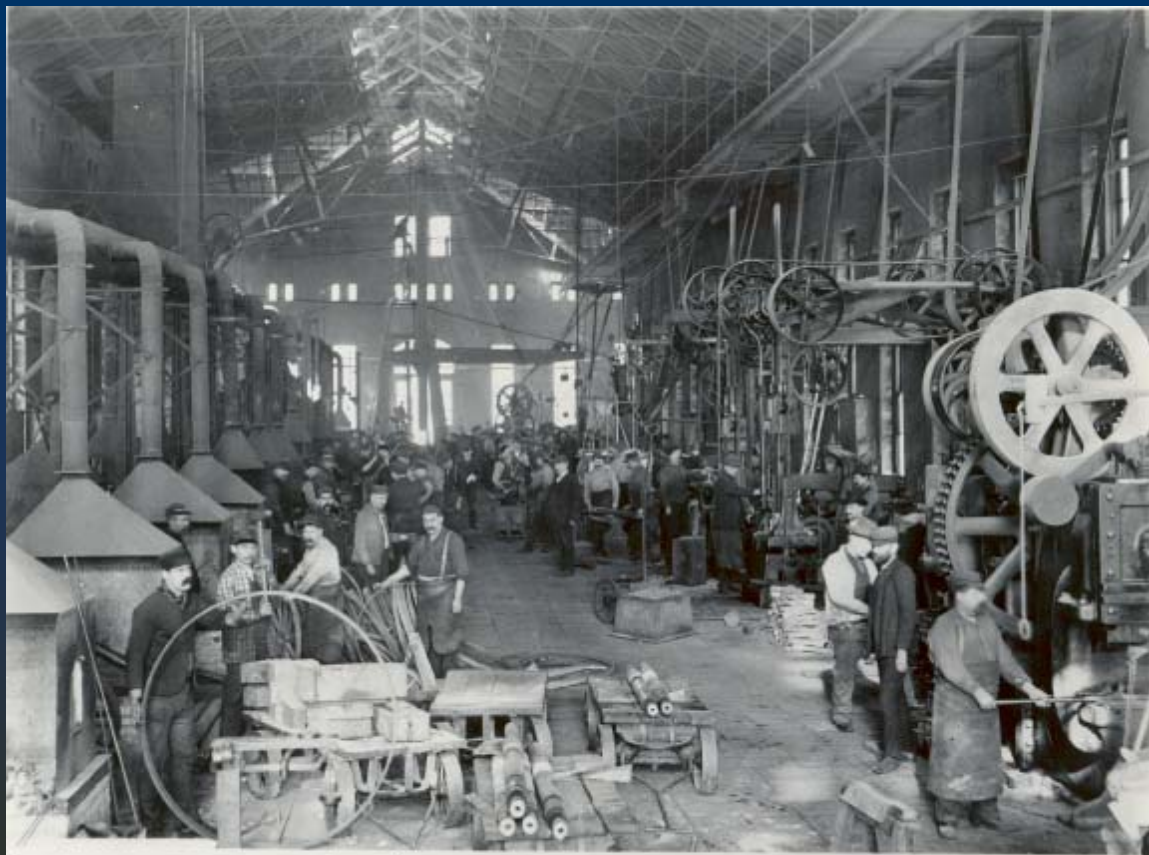
ARSENAL ISLAND HISTORY



- 1st Hydro-electric Conversion, circa 1900



ARSENAL ISLAND HISTORY



765-630

May 12, 1904

ROCK ISLAND ARSENAL

ORDNANCE DEPARTMENT

Shop E, Building #106. Blacksmith Shop, west wing.

- Blacksmith Shop, 1904



ARSENAL ISLAND HISTORY



- Current Hydro-electric Plant, circa 1919



MANUFACTURING HISTORY

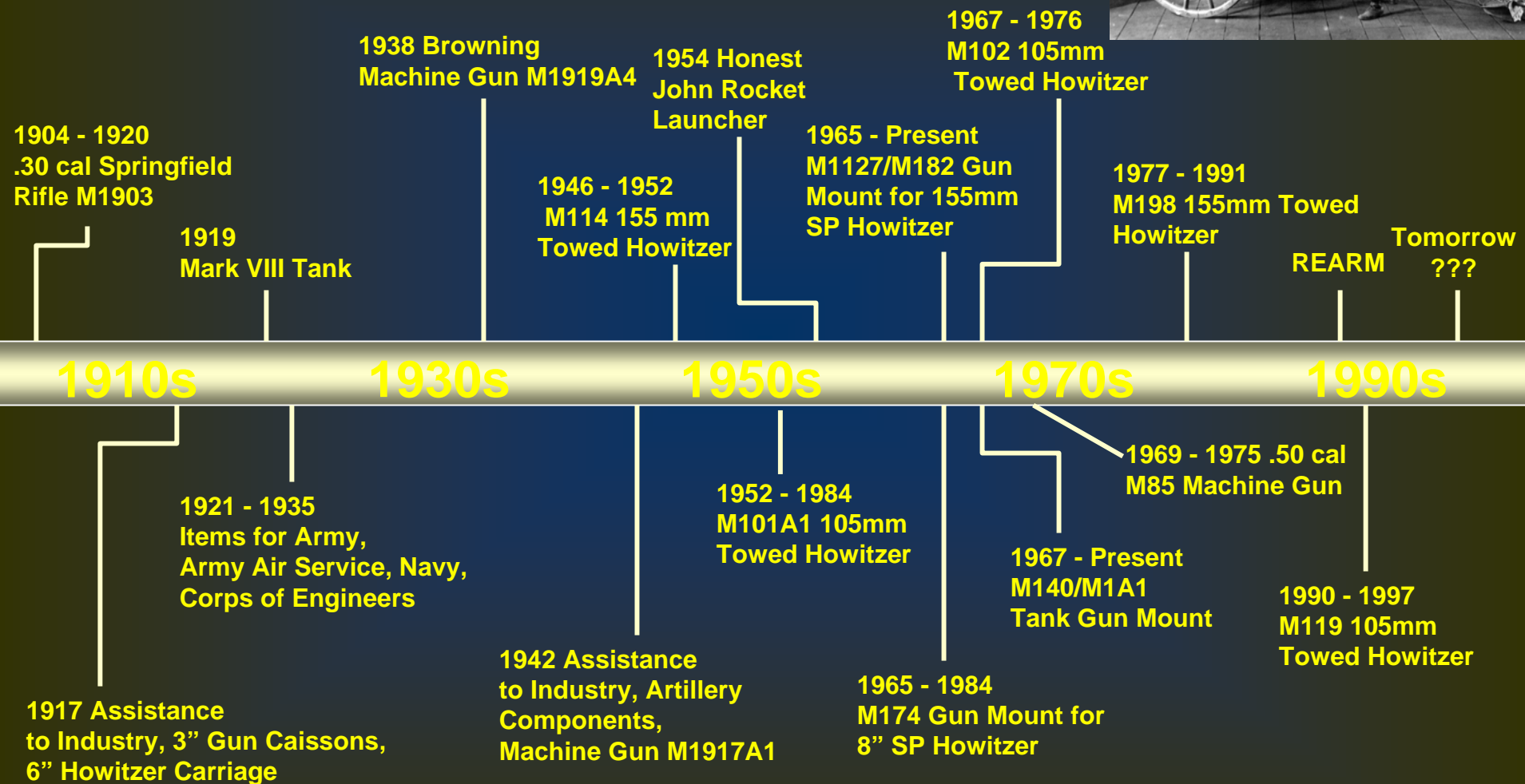
- History of Products
- Current Products
- Capabilities & Skills
- Quality Assurance



**The Army's Industrial Strike Force
Enabling the Warfighter at Every Level**



History of RIA Manufacturing

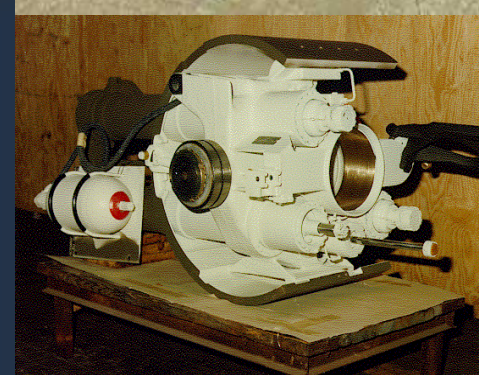


CORE Products

Only Domestic Producer of
Hydro-Pneumatic Recoil Mechanisms



Howitzers, Cradles,
Recoils, Mounts, BII,
Tool Sets, & Shelters





Manufacturing Capabilities

WELDING

FOUNDRY

FORGING

MACHINING

CASTINGS



SIMULATION

INSPECTION

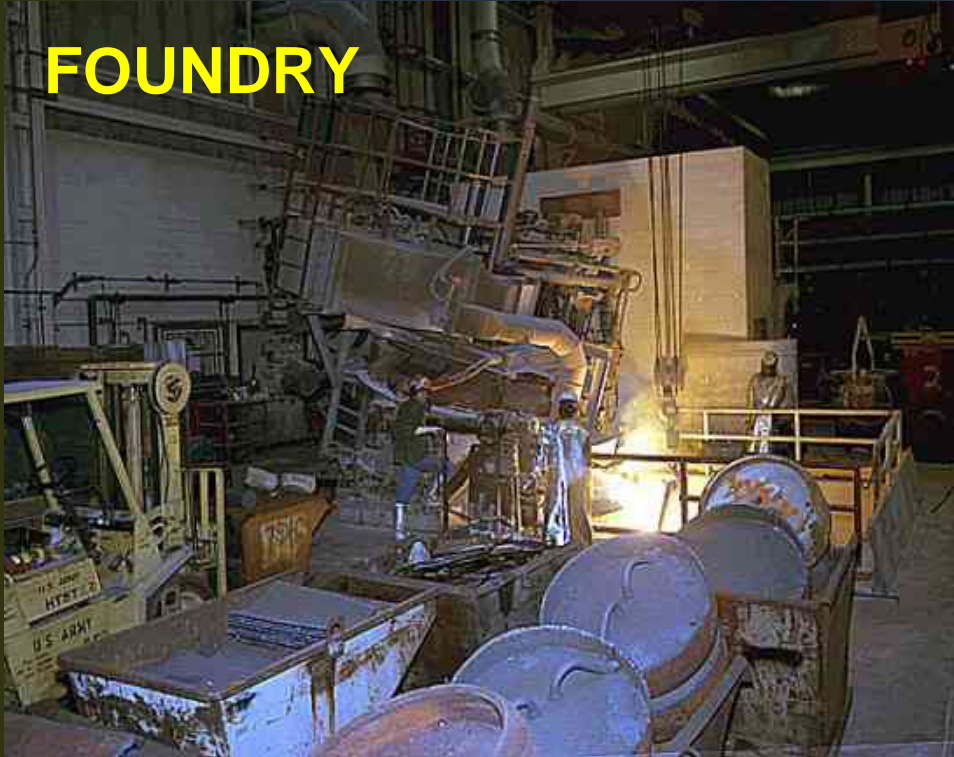
**LARGE
ASSEMBLY**

**ASSEMBLY
CLIMATE
CONTROLLED**

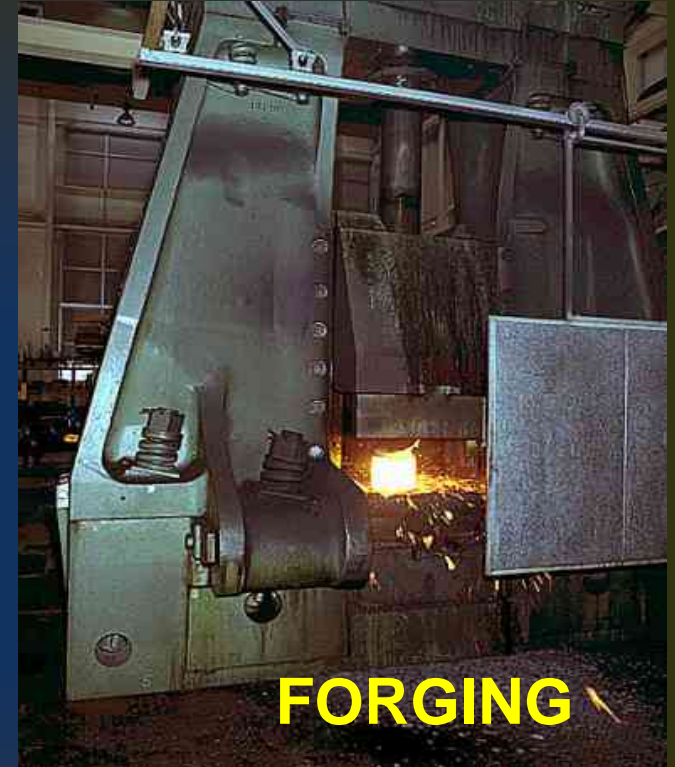
**Rock Island Arsenal
Kingsbury
Manufacturing
Complex**

Manufacturing Capabilities

FOUNDRY



FORGING



**Rock Island Arsenal
Kingsbury
Manufacturing
Complex**



Manufacturing Capabilities

WELDING



WELDING



**Rock Island Arsenal
Kingsbury
Manufacturing
Complex**



Manufacturing Capabilities

MACHINING



CASTINGS



**Rock Island Arsenal
Kingsbury
Manufacturing
Complex**



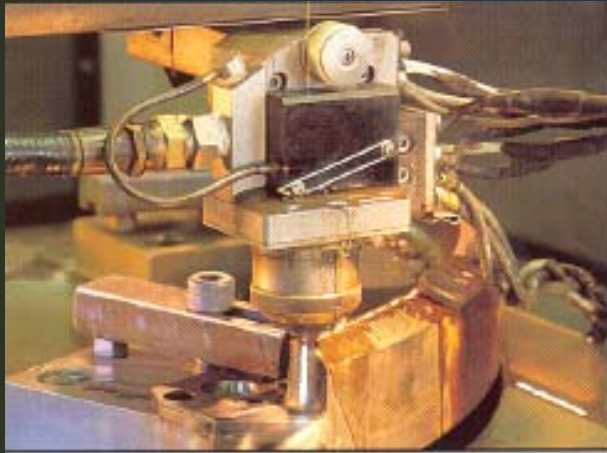
Manufacturing Capabilities



4-Axis Machining Centers



Manufacturing Capabilities



**Wire Electrical
Discharge
Machine**



7-Axis Machining Centers



Manufacturing Capabilities



**LARGE
ASSEMBLY**

**Rock Island Arsenal
Kingsbury
Manufacturing
Complex**



**ASSEMBLY
CLIMATE CONTROLLED**



Manufacturing Capabilities



**Rock Island Arsenal
Kingsbury
Manufacturing
Complex**



Other Manufacturing Capabilities

- Precision Cutting Tools
 - Lasers, Water Jets, etc
- Robotic Welders
- Electron Beam Welder
- Investment Casting
- State-of-Art Plating Shop
- Optical Scanning, 0.0001 inch

**Rock Island Arsenal
Kingsbury
Manufacturing
Complex**



Pride in Excellence

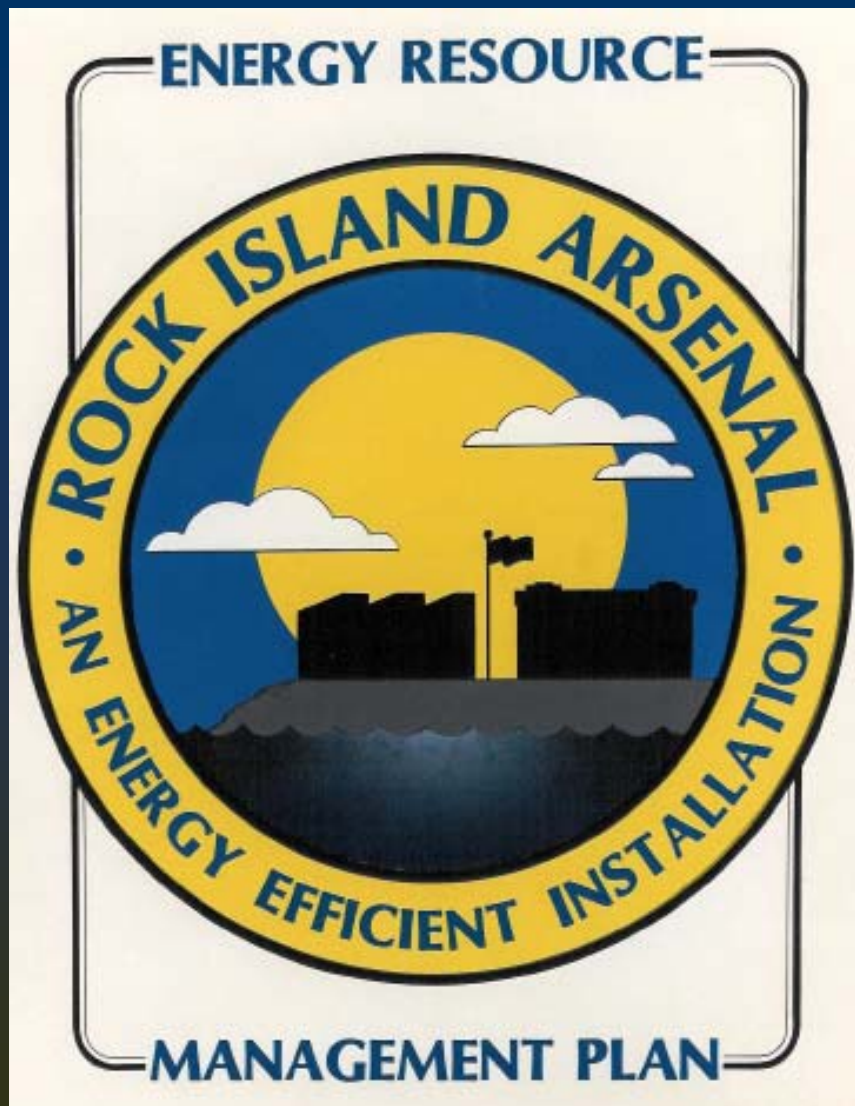
- ***Army Communities of Excellence:***
 - Chief of Staff Award - 1998, 1999, 2000, 2001
- ***Presidential Quality Award:***
 - Award of Merit - 1998
 - Army Nominee - 1999 & 2000
- ***Navy's Best Manufacturing Practices:***
 - 35 of 72 Practices documented as BMPs
- ***National Partnership Council***
 - National Award Winner - 1997
- ***International Standards Organization (ISO)***
 - Certified to ISO 9002 - 1997 - Present
- ***Army Contractor Performance Certification Program***
 - Certified to (CP) ² - 1995 - Present



Partnership Award



ARSENAL ENERGY PROGRAM





ARSENAL ENERGY PROGRAM

- ENERGY GOALS
- PROGRESS REPORT
- CONSERVATION PROJECTS
- FUNDING SOURCES
- METERING PLAN
- AWARENESS PLAN
- ENERGY PLANS & POLICIES





RIA ENERGY PROGRAM

PROGRESS TOWARDS GOALS

- **FY 1985 BASELINE:** 201 MBTU/Ksf
- **FY 2010 GOAL (35%):** 131 MBTU/kSF
- **FY 2004 GOAL:** 150 MBTU/kSF
- **FY 2003 RESULTS:** 138 MBTU/kSF
- **FY 2004 TO DATE:** 5.5 % Decrease

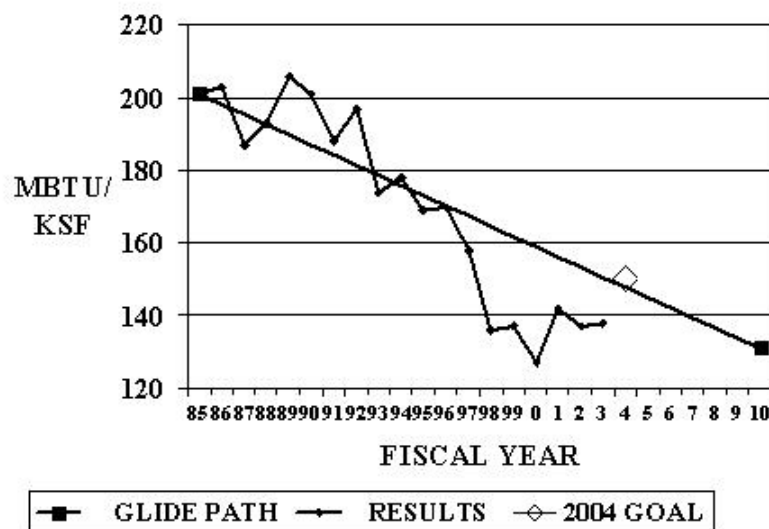




RIA ENERGY PROGRAM

FY 2002 FACILITY GOAL CHART

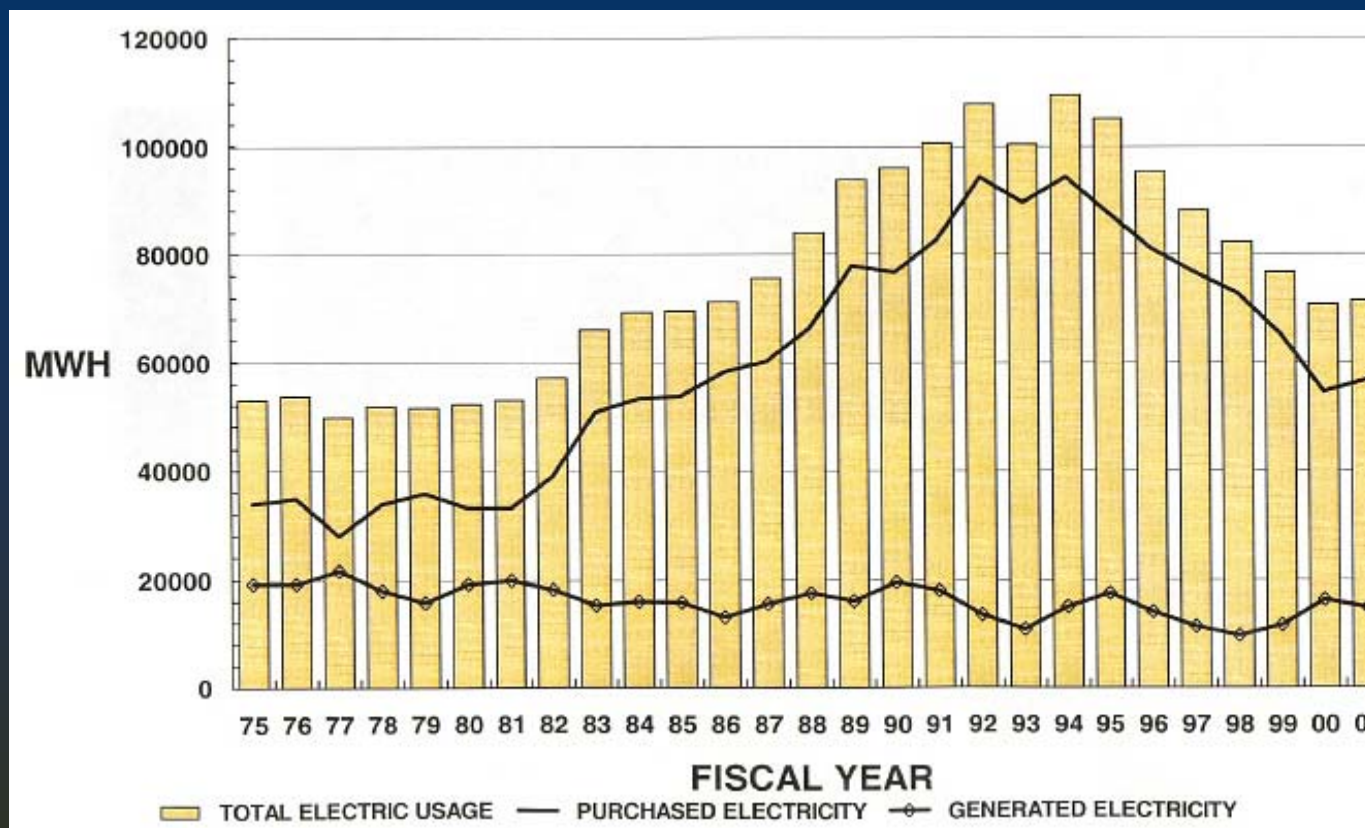
PUBLIC WORKS FY 2004 FACILITY ENERGY GOAL ROCK ISLAND ARSENAL





RIA ENERGY PROGRAM

FY 2002 ELECTRIC TREND





RIA ENERGY PROGRAM

GENERAL COST REDUCTION PLAN

- **REDUCE PRICE OF PURCHASED ENERGY**
- **REDUCE LOAD OR NEED**
- **REDUCE EQUIPMENT OPERATING HOURS**
- **IMPROVE OPERATING EFFICIENCY**





RIA ENERGY PROGRAM

REDUCE PRICE OF ENERGY



- PURCHASE COMPETETIVELY
- AVOID PEAK DEMAND CHARGES
- USE CHEAPEST FUELS
- MAINTAIN ACCOUNTING SYSTEM





RIA ENERGY PROGRAM

REDUCE LOAD OR NEED



- CONSOLIDATE BUILDING SPACE
- ENERGY EFFICIENT ENVELOPES
- REDUCE OVERHEATING & OVERCOOLING
- ELIMINATE LEAKS





RIA ENERGY PROGRAM

REDUCE EQUIPMENT OPERATING HOURS



- **DDC HVAC CONTROL SYSTEMS**
- **OPERATE LIGHTING ONLY WHEN NEEDED**
- **USE OCCUPANCY SENSORS**
- **SHUT OFF COMPUTERS AT NIGHT**





RIA ENERGY PROGRAM

IMPROVE OPERATING EFFICIENCY



- ENERGY EFFICIENT LIGHTS
- HIGH EFFICIENCY MOTORS & PROCESS
- HEATING PLANT IMPROVEMENTS
- HVAC IMPROVEMENTS
- CHILLER REPLACEMENTS





RIA ENERGY PROGRAM

MAJOR PROJECTS TYPES

- **HEATING PLANT & STEAM SYSTEM**
- **HYDROPLANT**
- **LIGHTING & ELECTRICAL**
- **HVAC & CHILLER PLANTS**
- **BUILDING ENVELOPE**
- **WATER SYSTEM**





RIA ENERGY PROGRAM

HQ FUNDED PROJECTS

| | <u>YEAR</u> | <u>PROJECT COST</u> | <u>SAVINGS/YR</u> |
|----------------------|-------------|---------------------|-------------------|
| • NAT. GAS TO V AREA | 94 | \$ 170K (FEMP) | \$ 30K |
| • EXPAND EMCS SYST. | 94 | \$ 180K (FEMP) | \$150K |
| • WAREHOUSE LIGHTS | 94 | \$ 300K (FEMP) | \$ 90K |
| • EXIT SIGN LAMPS | 94 | \$ 15K (FEMP) | \$ 7K |
| • HYDROPLANT MOD | 95 | \$3,000K (ECIP) | \$500K |
| • HYDRO TURBINES (4) | 95 | \$2,500K (FEMP) | \$500K |
| • N. GAS TO PVG GNDS | 95 | \$ 277K (FEMP) | \$ 35K |
| • LIGHTING, BLDG 350 | 95 | \$ 820K (ECIP) | \$150K |
| • LIGHTING, BLDG 220 | 95 | \$ 778K (ECIP) | \$140K |



RIA ENERGY PROGRAM

HQ FUNDED PROJECTS

| | <u>YEAR</u> | <u>PROJECT COST</u> | <u>SAVINGS/YR</u> |
|----------------------|-------------|--------------------------------|-------------------|
| • TEMP. CONTROLS | 95 | \$ 458K <small>(FEMP)</small> | \$ 90K |
| • HYDRO TURBINES (4) | 97 | \$2,500K <small>(ECIP)</small> | \$500K |
| • REPAIR STEAM TRAPS | 97 | \$ 712K <small>(FEMP)</small> | \$300K |
| • TOTALS | | \$11,710K | \$2,342K |





RIA ENERGY PROGRAM

LIGHTING PROJECT STATISTICS

| | <u>COST</u> | <u># FIXTURES</u> | <u>OLD KW</u> | <u>NEW KW</u> |
|--------------|-------------|-------------------|---------------|---------------|
| BLDG 299 | \$300k | 1,100 | 459 | 145 |
| BLDG 350 | \$820k | 5,000 | 800 | 334 |
| BLDG 220 | \$864k | 3,100 | 891 | 273 |
| ESPC - LITES | \$5,106 | 25,185 | 4,078 | 1,904 |
| TOTALS | \$7,090k | 34,385 | 6,228 | 2,656 |

TOTAL REDUCTION: 3,572 KW





RIA ENERGY PROGRAM

RECENT AWP PROJECTS

- **LIGHTING, BLDG 390, BLDG 68 (FY 99)**
- **LIGHTING, ELECTRIC SERVICE, 62 (FY 01)**
- **HVAC CONTROLS, 210, 211, 212E (FY 01)**
- **HVAC CONTROLS, 208, 212W, (FY 02)**
- **HVAC VFD's, 102-110, (FY 02)**
- **HVAC VFD's, REARM, (FY 02-03)**
- **WATER SYSTEM VFD'S, 9, 52, (FY 02)**





RIA ENERGY PROGRAM

5 ESPC PROJECTS (PR 1999-3066)

DEAM36-02-C-4500-A00001

- **GEOHERMAL IN HOUSING** (PR 2002-6206)
- **LIGHTING CONVERSIONS** (PR 2002-6207)
- **HVAC CONTROLS** (PR 2002-6208)
- **HYDRO-ELECTRIC TURBINES** (PR 2002-6209)
- **PEAK GENERATOR** (PR 2002-6210)





ESPC DEFINITION: ENERGY SAVING PERFORMANCE CONTRACT

- **A MECHANISM TO CREATE PARTNERSHIPS TO FINANCE AND IMPLEMENT ENERGY PROJECTS**
- **THE PRIME CONTRACTOR CARRIES THE CONTRACTING RISK**
- **THE ARSENAL'S ONLY UP-FRONT COSTS ARE FOR PROCUREMENT AND ADMINISTRATION**
- **ESPC's MAY INVOLVE THIRD PARTY FINANCING**
- **PROJECTS ARE PAID FOR OVER AN AGREED UPON TERM WITH ENERGY AND O&M SAVINGS**





RIA ENERGY PROGRAM

CURRENT ESPC COST SUMMARY

| <u>ITEM</u> | <u>COST (\$k)</u> | <u>SAVINGS (\$K)</u> |
|----------------|-------------------|----------------------|
| GEOTHERMAL | \$ 352 | \$ 17.4 |
| LIGHTING | \$ 5,106 | \$ 402.2 |
| HVAC CONTROLS | \$ 417 | \$ 86.5 |
| HYDRO-ELECTRIC | \$ 2,836 | \$ 155.1 |
| PEAK SHAVER | \$ 1,083 | \$ 27.1 |
| <u>TOTALS:</u> | <u>\$ 9,794</u> | <u>\$ 688.2</u> |

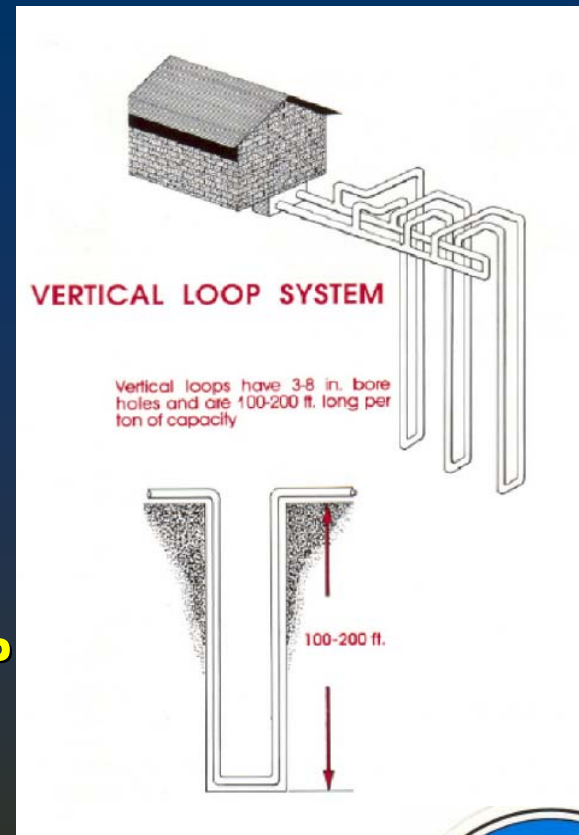




RIA ENERGY PROGRAM

ESPC: GEOTHERMAL IN HOUSING

- AFFECTS BUILDINGS 90 THRU 100
- 40 FAMILY HOUSING UNITS
- CLOSED LOOP SYSTEMS
- 2 WELLS PER APARTMENT
- 4 INCH BORE HOLE, 200 FEET DEEP
- GROUND-SOURCE HEAT PUMPS REPLACE FURNACES AND A/Cs





RIA ENERGY PROGRAM

ESPC: LIGHTING ACTIONS

- **AFFECTS 56 BUILDINGS**
- **24,000 LIGHT FIXTURES CONVERTED**
- **WILL STANDARDIZED ALL HIGH INTENSITY DISCHARGE FIXTURES IN REARM**
- **T-8 FLUORESCENT THROUGHOUT ADMIN SPACE**
- **OCCUPANCY SENSORS IN RESTROOMS AND SIMILAR APPLICATIONS**
- **LIGHT EMITTING DIODE TRAFFIC LIGHTS**





RIA ENERGY PROGRAM

ESPC: HVAC CONTROLS

- PHASE III OF REARM AREA
- BUILDINGS 220, 222, 230
- INSTALLS DIRECT DIGITAL CONTROLS
- AFFECTS 21 EXHAUST FANS, 26 HEATING AND VENTILATING UNITS, & FIVE MISC. UNITS.





RIA ENERGY PROGRAM

ESPC: HYDRO-ELECTRIC TURBINES



- RENOVATES UNITS 2, 5, & 9
- RESULTS IN ADDITIONAL 700 KW OF POWER
- REPLACES DETERIORATED RUNNERS WITH STAINLESS STEEL, RECONDITIONS OTHER MECHANICAL COMPONENTS





RIA ENERGY PROGRAM

ESPC: PEAK SHAVER



- **1000 KILO-WATT STANDBY GENERATOR**
- **DIESEL ENGINE**
- **200 HRS PER YEAR ANTICIPATED**
- **3000 GALLON BASE MOUNTED TANK**





RIA ENERGY PROGRAM

FY 05 & 06 ECIP PROJECTS

- **CHILLER REPLACEMENT, PR 2004-0730**
 - **2375 TONS COOLING**
 - **BLDG 348 PLANT**
 - **BLDG 73 PLANT**
 - **STEAM MAIN IMPROVEMENTS**
- **CHILLER REPLACEMENTS, FY 2006**
 - **BLDG 114 PLANT**
 - **PACKAGE BOILER?**





RIA ENERGY PROGRAM INDUSTRIAL ACCOMPLISHMENTS

- **REARM – MAJOR INDUSTRIAL RENOVATION COMPLETED IN 1990'S**
 - **BUILDING CONSOLIDATION**
 - **HEATING PLANT RENOVATION**
 - **AUTOMATED STORAGE**
 - **STATE OF ART MFG TECHNOLOGIES**
 - **ENERGY EFFICIENT STRUCTURES**
- **SHORT CYCLE HEAT TREAT STUDY**
- **ENERGY EFFICIENT MOTORS**





RIA ENERGY PROGRAM INDUSTRIAL OPPORTUNITIES

- **PACKAGE BOILER FOR SUMMER**
- **MANUFACTURING VENTILATION**
 - **PLATING SHOP TANKS**
 - **MIST CONTAINMENT**
- **PAINT BOOTH CONTAINMENT AND HEAT RECOVERY**
- **BUILDING ENVELOPE IMPROVEMENTS**
- **EFFICIENT SPACE UTILITIZATION**
- **WATER CONSERVATION?**





RIA ENERGY PROGRAM

FUTURE INITIATIVES

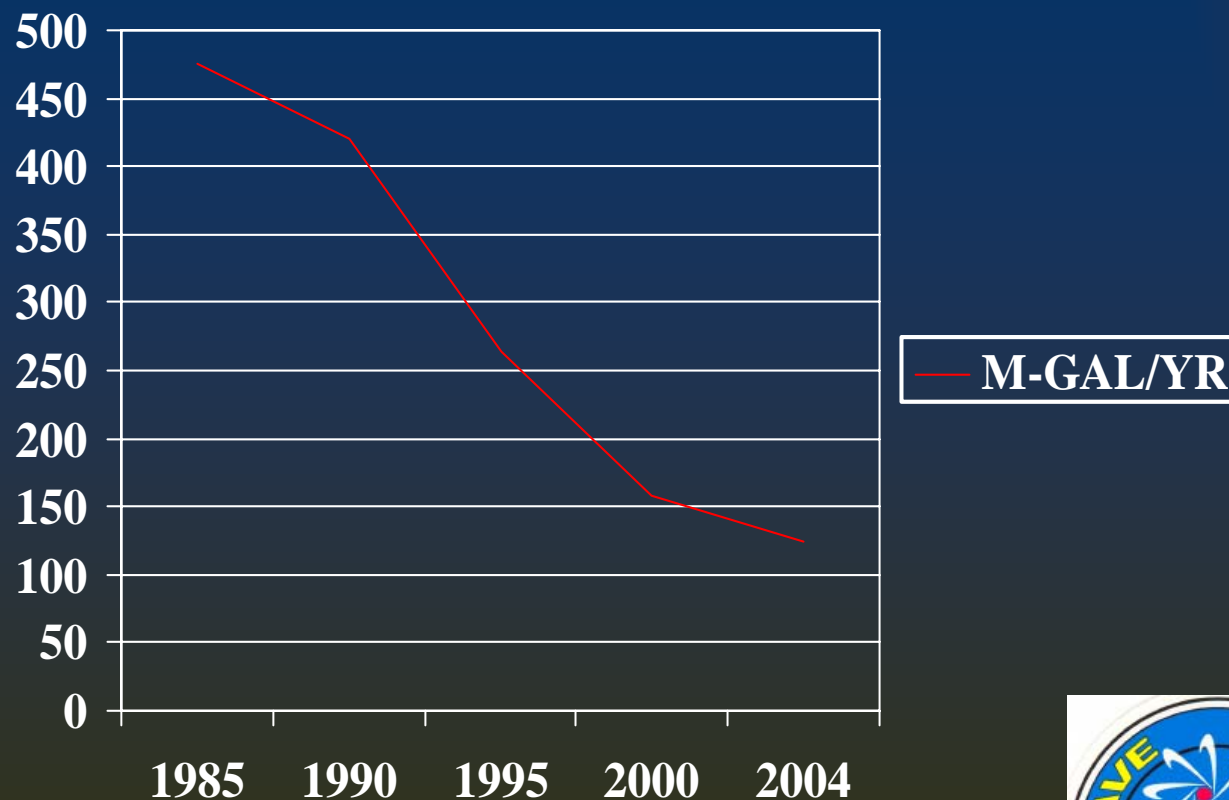
- **MODERNIZE OR REPLACE HEATING PLANT
(DETERMINE BEST OPTION)**
- **INSULATE ADMIN BUILDINGS**
- **INSTALL THERMAL WINDOWS**
- **GEOHERMAL FOR ADMIN BLDGS**
- **MANUFACTURING VENTILATION &
INDUSTRIAL PROCESSES**







RIA ENERGY PROGRAM WATER CONSERVATION PLAN - PROGRESS CHART





RIA ENERGY PROGRAM WATER CONSERVATION PLAN - SYTEM AUDITS

- **ULTRASONIC MONITORING CONDUCTED ANNUALLY**
- **WASTEWATER FLOW MONITORED REGULARLY**
- **WATER FLOW MONITORED MONTHLY**





RIA ENERGY PROGRAM WATER CONSERVATION PLAN -BOILER/STEAM SYSTEMS

- BY CONTRACT, BASE OPERATIONS MUST MAINTAIN 70% CONDENSATE RETURN**





RIA ENERGY PROGRAM WATER CONSERVATION PLAN - COOLING SYSTEMS

- **ONE-PASS COOLING HAS BEEN NEARLY ELIMINATED OVER PAST 10 YEARS**
- **FOUNDRY PROJECT**
- **COMPRESSOR PLANT PROJECT**





RIA ENERGY PROGRAM WATER CONSERVATION PLAN - COOLING TOWER MANAGEMENT

- REQUIREMENTS DEFINED AND
MONITORED THROUGH BASE-OPS
CONTRACT**





RIA ENERGY PROGRAM WATER CONSERVATION PLAN - HIGH USING PROCESS

- **NONE DEFINED AT THIS TIME**

